

Claims

1. A wavelength converting method that wavelength-converts a light through a non-linear optical crystal, characterized in that an atmosphere that is in contact with a surface of said non-linear optical crystal from which the light that has been wavelength-converted is outputted is a gas that is smaller in content of nitrogen elements than air, and the wavelength conversion is conducted in the atmosphere.
2. A wavelength converting method according to claim 1, characterized in that an incident end surface of the non-linear optical crystal to which the light to be wavelength-converted is inputted and the outgoing end surface of the non-linear optical crystal from which the wavelength-converted light is outputted are surrounded by a gas that is smaller in the content of nitrogen elements than air, and the wavelength conversion is conducted in the gas.
3. A wavelength converting method according to claim 1, characterized in that an atmosphere that is in contact with the incident end surface of the non-linear optical crystal to which the light to be wavelength-converted is inputted and an atmosphere that is in contact with an outgoing end surface of the non-linear optical crystal from which the wavelength-converted light is outputted are gases that contain different components, respectively, and the wavelength conversion is conducted in the gases.

4. A wavelength converting method according to claim 1, characterized in that the gas that is smaller in the content of nitrogen elements than air is circulated.

5. A wavelength converting method according to claim 4, characterized in that after the gas that is smaller in the content of nitrogen elements than air is supplied to the vicinity of at least the outgoing end surface of the non-linear optical crystal, the gas is exhausted.

6. A wavelength converting method according to claim 1, characterized in that the gas that is smaller in the content of nitrogen elements than air is a gas that is 10% or less in the volume content of the gas containing nitrogen elements therein.

7. A wavelength converting method according to claim 1, characterized in that the non-linear optical crystal is a crystal including cesium.

8. A wavelength converting method according to claim 1, characterized in that the gas is a gas that mainly contains any one of a rare gas, an oxygen gas and a carbon dioxide gas.

9. A wavelength converting method according to claim 3, characterized in that the gas which is an atmosphere that is in contact with a surface of the non-linear optical crystal from which the wavelength-converted light is outputted and smaller in the content of nitrogen elements than air is a gas that mainly contains argon gas therein.

10. A wavelength converting device that wavelength-converts a light through a non-linear optical crystal, characterized by comprising a means for setting an atmosphere that is in contact with a surface of said non-linear optical crystal from which the light that has been wavelength-converted is outputted to a gas that is smaller in content of nitrogen elements than air.

11. A wavelength converting device according to claim 10, characterized in that the wavelength-converted light that is 5 W or higher in mean power is outputted.

12. A wavelength converting device according to claim 10, characterized by further comprising a means for surrounding an incident end surface of the non-linear optical crystal to which the light to be wavelength-converted is inputted and an outgoing end surface of the non-linear optical crystal from which the wavelength-converted light is outputted by a gas that is smaller in the content of nitrogen elements than air.

13. A wavelength converting device according to claim 10, characterized by further comprising a means for setting an atmosphere that is in contact with the incident end surface of the non-linear optical crystal to which the light to be wavelength-converted is inputted and an atmosphere that is in contact with the outgoing end surface of the non-linear optical crystal from which the wavelength-converted light is outputted to gases that contain different components, respectively.

14. A wavelength converting device according to claim 10, characterized by further comprising a means for allowing the gas that is smaller in the content of nitrogen elements than air to be circulated.

15. A wavelength converting device according to claim 14, characterized in that a non-linear optical crystal is disposed within a vessel in which a window or an opening that allows an incident light or an outgoing light to pass therethrough is partially disposed, and a means for supplying a gas which is smaller in the content of nitrogen elements than air to the vicinity of at least the outgoing end surface of the non-linear optical crystal within said vessel, and a means for exhausting said supplied gas from said vessel are provided.

16. A wavelength converting device according to claim 10, characterized in that the gas that is smaller in the content of nitrogen elements than air is a gas that is 10% or less in the volume content of the gas containing nitrogen elements therein.

17. A wavelength converting device according to claim 10, characterized in that the non-linear optical crystal is a crystal including cesium.

18. A wavelength converting device according to claim 10, characterized in that the gas that is smaller in the content of nitrogen elements than air is a gas that mainly contains any one of a rare gas, an oxygen gas and

a carbon dioxide gas.

19. A wavelength converting device according to claim 13, characterized in that the gas which is an atmosphere that is in contact with a surface of the non-linear optical crystal from which light is outputted and smaller in the content of nitrogen elements than air is a gas that mainly contains argon gas therein.

20. A laser machining device comprising a machining device, a laser device which is a light source for wavelength conversion as a machining light source and a means for setting an atmosphere which is in contact with a surface of a non-linear optical crystal from which a wavelength-converted light is outputted to a gas which is smaller in the content of nitrogen elements than air, and a wavelength converting device that wavelength-converts a laser beam from said laser device through said non-linear optical crystal.